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S P E C I F I C A T I O N

15 TO ALL WHOM IT MAY CONCERN:

Be it known that we, RYOICHIRO SATO and
YOJI FURUYA, subjects of Japan, respectively at
10-3-315, Tsurumichuo 2-chome, Tsurumi-ku, Yokohama-shi,
Kanagawa-ken, Japan, 2-207, Ribere Koyodai, 5-10,
20 Koyodai, Inagi-shi, Tokyo, Japan, have jointly invented
a certain new and useful improvement in INFORMATION
PROCESSING APPARATUS, of which the following is a full,
clear, concise and exact description.

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1 TITLE OF THE INVENTION:

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Information Processing Apparatus

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BACKGROUND OF THE INVENTION:

(a) Field of the Invention

5 The present invention relates to an information processing apparatus and, more particularly, to an information processing apparatus having a telephone function or communication function and a character recognition function.

10 (b) Related Background Art

 In recent years, a multi-functional information processing apparatus having, e.g., a personal computer function and a telephone function or facsimile function has been widely used. In order to input data such as a "company name" and a "telephone number" described on a printed matter, e.g., a name card or pamphlet and to register the data as a data base, a keyboard and a display are used to input the data.

20 In the above conventional apparatus, however, although an image scanner as a facsimile function can read a printed matter such as a card or pamphlet, data can be input by only a key input operation performed by an operator. Therefore, input errors and the like easily occur and an input time is prolonged to decrease an operation efficiency.

25 In the above conventional information processing apparatus, customer information such as a "company

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a

1 name" and a "telephone number" registered as a data
base are stored in units of indexes in the order of
kana syllabary (a, i, u, ..., o, n) or in the
alphabetical order. In order to use the above customer
5 information for the facsimile function or telephone
function, an index is designated, customer information
belonging to the designated index is displayed on a
display, and an item to be transmitted is designated
from the displayed customer information.

10 In the above conventional technique, however,
since each transmission customer is simply displayed on
the display in units of indexes and selected, a
transmission customer must be designated for each
index. Therefore, when a plurality of transmission
15 customers or transmission customers in different
indexes are to be designated, ^{the} ~~an~~ operation is
complicated. In particular, it is difficult to
simultaneously designate a plurality of transmission
customers in order to perform multi-address
20 transmission.

For this reason, since data for multi-address
transmission must be additionally registered, a data
processing function of a personal computer has not been
sufficiently achieved.

25 In the above information processing apparatus, an
index to which data of a required transmission customer
belongs must be known. If an index is not known,

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1 indexes must be sequentially called and checked to
result in a very cumbersome operation. The data
processing function of a personal computer has not been
sufficiently achieved also in this point of view.

5 SUMMARY OF THE INVENTION:

The present invention has been made to solve the
above problems and has as its object to provide an
image processing apparatus capable of reading image
information and registering information obtained by
10 character recognition as a data base.

It is another object of the present invention to
provide an image processing apparatus capable of
utilizing transmission customer data registered in a
data base more effectively, thereby increasing an
15 operation efficiency in multi-address transmission or
the like.

It is still another object of the present
invention to provide an information processing
apparatus capable of reading image information
20 including telephone number data, performing character
recognition for the read image information and storing
the image information as a data base, and when the
telephone number data included in the image information
stored as the data base is searched, performing calling
25 in accordance with the searched telephone number data.

It is still another object of the present
invention to provide an information processing

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1 apparatus having a search function based on a key word
and capable of inputting a key word to select one or a
plurality of facsimile transmission customers from a
data base in which customer information of a plurality
5 of facsimile transmission customers are registered.

BRIEF DESCRIPTION OF THE DRAWINGS:

Fig. 1 is a block diagram showing an embodiment of
the present invention;

Fig. 2 is a perspective view showing an outer
10 appearance of the embodiment shown in Fig. 1;

Fig. 3 is a view showing a main menu;

Fig. 4 is a view showing a telephone menu;

Figs. 5 to 7 are views showing telephone book
menus;

15 Figs. 8 to 10 are views showing card file menus;

Figs. 11A and 11B are views for explaining a
method of inputting a character string in a card data
frame;

Figs. 12 to 14 are views showing card file menus;

20 Fig. 15 is a flow chart for explaining operations
corresponding to respective icons;

Figs. 16A and 16B are flow charts for
explaining operations of telephone book programs;

Figs. 17A to 17F are flow charts for
25 explaining operations of card file programs;

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1 Fig. 18 is a view for explaining an analyzing
direction of each line on a card image in character
recognition;

 Figs. 19A to 19D are flow charts for
5 explaining in detail parts of the procedures shown in
Figs. 17A to 17F;

 Fig. 20 is a flow chart for explaining a
transmission operation in a facsimile function;

 Fig. 21 is a view showing a relationship between
10 the contents of a telephone book file, a search key
word, and a FAX transmission list file;

 Fig. 22 is a perspective view showing an outer
appearance of a telephone set as a most simple
application form of the present invention;

15 Fig. 23 is a block diagram of the telephone set
shown in Fig. 22;

 Fig. 24 is a view for explaining a card conveyor
unit;

 Figs. 25A to 25C are flow charts for
20 explaining operations of the telephone set shown in
Fig. 23;

 Figs. 26A and 26B are views for explaining
card insertion directions;

 Figs. 27A and 27B are views for explaining
25 search directions of image data;

 Fig. 28 is a plan view of a telephone set as
another application form of the present invention;

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1 Fig. 29 is a block diagram of the telephone set
shown in Fig. 28;

 Figs. 30A and 30B are flow charts for
explaining operations of the telephone set shown in
5 Fig. 28;

 Figs. 31A and 31B are flow charts for
explaining a part of the procedure shown in Fig. 30(a);
and

 Fig. 32 is a view showing a matrix pattern on the
10 upper surface of the telephone set shown in Fig. 28.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS:

 A preferred embodiment of the present invention
will be described below with reference to the
accompanying drawings.

15 <Description of Apparatus>

 Fig. 1 is a block diagram showing an apparatus
according to the present invention. Referring to
Fig. 1, a central processing unit (to be referred to as
a CPU hereinafter) 1 controls the overall apparatus,
20 and a memory 2 includes control programs 2a, a display
icon font 2b, and a character font 2c. A touch panel 4
covers a display surface of a CRT display 3. When a
user activates an icon displayed on the CRT display 3,
an instruction is input to the apparatus. The CPU 1 is
25 connected to a keyboard 5 for key input, an auxiliary
storage 6 for storing the programs 2a or a large amount
of data (document data or the like to be transmitted by

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1 a facsimile function), a speaker 7 for alarming a user
of key input or occurrence of an error by a sound, an
image scanner 8 for reading a card image, a facsimile
9, a printer 10 for printing, and a telephone set 11
5 including a processing device (not shown) for a
telephone line and a handset 11a.

Fig. 2 is a perspective view showing an outer
appearance of the apparatus according to this
embodiment. Referring to Fig. 2, the touch panel 4
10 covers the CRT display 3 as described above. An
overall apparatus 12 includes a floppy disk insertion
port 13 constituting a part of the auxiliary storage 6,
a card inlet 14, a card outlet 15, a card guide 16, a
telephone line 17, and a power source 18.

15 Note that the ports 14 and 15 and the guide 16
have a size suitable for any sheet used in reading of
the facsimile, printing of the printer, or the like.

Fig. 3 shows a main menu displayed on the CRT
display 3 immediately after a power switch of the
20 apparatus 12 is turned on. When a user activates a
portion on the touch panel 4 located in front of the
screen by a finger 27, a program indicated by the
touched icon is activated. Referring to Fig. 3, an
icon 20 is for an "environment" program for adjusting a
25 speaker volume, screen brightness, and the like of the
apparatus 12, an icon 21 is for a "message" program for
leaving a message in the apparatus 12, an icon 22 is

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1 for a "telephone" program for setting a telephone menu,
an icon 23 is for a "fax" program for setting a fax
menu, an icon 24 is for a "wordprocessor" program, an
icon 25 is for a "card file" program for managing
5 cards, and an "end" icon 26 is for performing an end
operation. The auxiliary storage 6 stores a number of
various programs in addition to the above programs.
When a user aligns icons for programs to be activated
on the main menu screen, the programs can be
10 registered.

Fig. 4 shows the telephone menu displayed when the
"telephone" icon 22 on the main menu screen is
activated by a user. The telephone menu includes push
buttons 30, a display column 31 for displaying a number
15 input from the push buttons 30, an "environment"
program activating button 32 for setting a telephone
number, a music, and the like of the apparatus 12, a
hooking button 33, a tone switching button 34 for
sending tones of the push buttons to a customer, a
20 music start/end button 35, an off hook button 36 for
setting an off hook state without picking up the
handset, a telephone book button 37 for searching a
telephone number from "telephone book" data, a re-dial
button 38 for calling a customer of the same telephone
25 number if the customer is busy, a card file button 39
for searching a telephone number from "card file" data,

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1 and an "end" button 26 for performing an end operation
of the telephone program.

Fig. 5 shows a telephone book menu displayed when
a user activates the telephone book button 37 shown in
5 Fig. 4. As shown in Fig. 5, the telephone book menu
includes an index 40 and a customer (name) 41. When a
user activates the customer 41, a phone call is
automatically made. The telephone book menu also
includes index buttons 42, a next page button 44 for
10 displaying a next page when a plurality of customer
data of the same index are present, and a preceding
page button 43 for displaying a preceding page. A
first page button 45 is for returning to a menu first
displayed when the telephone book button 37 is
15 activated.

Figs. 6 and 7 show menus displayed when a user
activates "Sa" and "Se" of the index buttons 42 shown
in Fig. 5, respectively.

Fig. 8 is a menu displayed when a user activates
20 the card file button 39 shown in Fig. 4 or the "card
file" icon 25 of the main menu shown in Fig. 3.

Referring to Fig. 8, the menu includes a frame 50
for displaying an image of a card read by the image
scanner 8, a frame 51 for displaying characters
25 obtained by analyzing the card image 50 by a pattern
matching method of character recognition, and a frame
52 for registering data of a card displayed in the

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1 frame 51 as a data base in units of types. A section
53 indicates examples of items of card data, and a
section 54 indicates examples of raw data of a card.
These sections have columns of a company name 55, a
5 division 56, a title 57, a personal name 58, an address
59, a phone number 60, a fax number 61, and a memo 62.

The card data frame 52 is also used for data
search. Buttons 63 to 74 indicate function menus for
various processing tasks. A read button 63 is for
10 performing automatic processing tasks such as reading
of a card image into the image frame 50 performed by
the image scanner 8, character recognition,
determination of a type, and writing in the card data
frame 52. A register button 64 is for newly
15 registering data read in the card data frame 52 into a
"card file". An image button 65 is for newly
registering data similar to the register button 64 and
for additionally registering a card image. When a user
inputs characters in a part of the card data frame 52
20 and activates a search button 66, data coincident with
the characters is searched from the "card file", and a
search result is displayed in the card data frame 52 in
units of cases. A next page button 68 is for
displaying a next case, and a preceding page button 67
25 is for displaying a preceding case. A print button 69
is for printing all of searched data. A correct button
70 is for partially correcting a displayed case of data

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1 after searching and re-registering the data in the
"card file". A delete button 71 is for deleting a
displayed case of data after searching from the "card
file". A telephone book button 72 is for registering a
5 telephone number or fax number in the card data frame
52 into "telephone book" data. A call button 73 is for
performing automatic calling by a telephone number in
the card data frame 52. This internal operation is
similar to automatic calling using the telephone book
10 shown in Figs. 5, 6, and 7. A clear button 74 is for
clearing all of unnecessary data on the screen. A user
clears data by this button, inputs characters in a part
of card data, and activates the search button 66,
thereby searching data coincident with the input
15 characters from the "card file".

Fig. 9 shows a state in which a user sets a card
at the card inlet 14 from the state shown in Fig. 8
described above and activates the card read button 63
and card reading processing is completed. A card image
20 read from the image scanner 8 is displayed in the image
frame 50, character recognition is performed on the
basis of the image, and the recognition result is
displayed in the frame 51. Only card data whose types
are determined in the frame 51 are set in the card data
25 frame 52. Note that if the company name begins with
katakanas (hiraganas), the kana part is automatically
set in a column for data indicating how to read. A

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1 logo mark of the company name of the card image 50 is
not displayed in the character recognition result frame
51 because it is not recognized as a character.

Fig. 10 shows a state in which a user activates a
5 telephone character line "(03)-ooo-xxxx" in the
character recognition result frame 51 and immediately
activates the type frame of the phone number column 60
which is blank in Fig. 9 in the card data frame,
thereby automatically setting the telephone number in
10 the phone number column 60. Fig. 11A shows a state
in which a user causes a character cursor to appear in
the column of data indicating how to read which is
blank in Fig. 10 of the personal name column 58, and
Fig. 11B shows a state in which the user inputs data
15 indicating how to read from the keyboard 5. Fig. 12
shows a state in which the user activates a return key
after the operations shown in Figs. 11A and 11B,
thereby completing input of the data indicating how to
read in the personal name column 58.

20 Fig. 13 shows a state in which a user inputs
search characters "□□□□ Corporation" in the company
name column 55 immediately before activating the search
button 66. Note that the search characters can be
input by a method similar to that shown in Figs. 11A
25 and 11B, i.e., can be input by the cursor. Fig. 14
shows a state of a menu obtained by activating the
search button from the state shown in Fig. 13. A

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1 message 75 indicates that 11 cases of card data whose
company names coincide with the "□□□□ Corporation" have
been found from the "card file" data. Data of the
first case is displayed from the company name column 55
5 to the memo column 62 in the card data frame 52. This
data is registered with an image, and a card image is
developed in the image frame 50. If a user wants to
see all of the 11 data, he or she need only repeatedly
activate the next page button 68 to sequentially
10 display the card data in the frame 52.

<Description of Operation>

Operations of the apparatus according to this
embodiment will be described below with reference to
flow charts shown in Figs. 15 to 17F.

15 Note that programs of this embodiment are started
when the apparatus 12 is connected to the power source
18, and the main menu shown in Fig. 3 is displayed on
the CRT display 3.

In step S1 shown in Fig. 15, whether a user
20 activates the "environment" icon is checked. If the
"environment" icon is activated, in step S2, the
environment menu is displayed to perform processing for
setting environments such as a speaker volume or screen
brightness by an input operation by the user. If the
25 end button 26 is activated, the flow advances to step
S13, and the screen is returned to the main menu. That
is, the flow returns to the start of this program.

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1 Similarly, whether the other icons are activated
are checked in steps S3, S5, S7, S9, and S11. If any
icon is activated, a program corresponding to the
activated icon is activated to execute corresponding
5 processing in step S4, S6, S8, S10, or S12. For
example, if the "message" icon is activated, the
message menu is displayed in step S4 to execute
"message" processing for storing a message in the
apparatus 12. If the "telephone" icon is activated,
10 the "telephone" menu is displayed in step S6 to execute
a telephone operation by the user. If the "fax" icon
is activated, the "fax" menu is displayed in step S8 to
execute a fax operation by the user. If the
"wordprocessor" icon is activated, the wordprocessor
15 menu is displayed in step S10 to execute word
processing by the user. If the "card file" icon is
activated, the "card file" menu is displayed in step
S12 to execute card data addition and search by the
user.

20 The auxiliary storage 6 stores a number of various
programs in addition to the above programs. Therefore,
the user can align program icons on the main menu and
add them as programs which can be immediately
activated. In the flow chart of Fig. 15, programs are
25 similarly added after steps S11 and S12.

 The "wordprocessor" program in step S10 of Fig. 15
includes a function of directly facsimile-transmitting

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1 a processed document in addition to a function of
printing it on paper as an output.

Figs. 16A and 16B are flow charts for
explaining programs corresponding to the "telephone
5 book" icon described with reference to Figs. 5 to 7.

In step S20, the "telephone book" menu is
displayed. In step S21, "A" is set as the index 40,
and customers 41 starting with "A" are displayed. At
the same time, "A, Ka, Sa, Ta, Na, Ha, Ma, Ya, Ra, and
10 Wa" is set in the index buttons 42. In step S22,
whether the user activates the customer 41 is checked.
If the customer 41 is activated, the flow advances to
step S23, and whether the handset 11a is off-hooked is
checked. If the handset 11a is off-hooked, the
15 telephone set 11 is instructed to make a call by using
a telephone number recorded in the customer 41 in step
S24, and the flow advances to step S25. If "NO"s are
determined in steps S22 and S23, the flow advances to
step S25, and whether the user activates the next page
20 button 44 is checked. If "YES" in step S25, the flow
advances to step S26, and whether a large number of
customers 41 are currently present and subsequent
customers 41 not displayed yet are present is checked.
If it is determined in step S27 that a next customer
25 group is present, the next customer group is displayed
in the customer 41 in step S28. After this display, if
"NO" is determined in step S25 or S27, the flow

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1 advances to step S29, and whether the user activates
the preceding page button 43 is checked. If the
preceding page button 43 is activated, whether a large
number of customers 41 of the current index 40 are
5 present and previous customers 41 not displayed yet are
present is checked in step S30. If it is determined in
step S31 that a preceding customer group is present,
the preceding customer 41 group is displayed in step
S32. After this display, if "NO"s are displayed in
10 steps S29 and S31, the flow advances to step S33, and
whether the user activates the first page button 45 is
checked. If the first page button 45 is activated,
processing from step S21 is repeated. If the first
page button 45 is not activated, the flow advances to
15 step S34, and whether the user activates the index
button 42 is checked. If the index button 42 is
activated, a reading of the activated index button 42
is set in the index 40 and customers 41 starting with
the index 40 are displayed in step S35. In step S36,
20 the index buttons 42 are updated. That is, if the
index 40 is any of "A, K, S, T, N, H, M, Y, R, and W",
five characters associated with the activated index are
set in the index buttons 42. For example, if "S" is
the index 40, "Sa, Si, Su, Se, and So" are set in the
25 index buttons 42. If the index 40 is other than "A, K,
S, T, N, H, M, Y, R, and W", only the index 40 is set
in the index button 42. For example, if "Se" is the

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1 index 40, only "Se" is set in the index button 42.
After this processing, if "NO" is determined in step
S34, the flow advances to step S37, and whether the
user activates the end button 26 is checked. If the
5 end button 26 is activated, the "telephone book"
program is ended. If the end button 26 is not
activated, the flow returns to step S22, and the
program processing is repeated from step S22.

An operation of the "card file" program
10 schematically described above with reference to Figs. 8
to 14 will be described below with reference to flow
charts in Figs. 17A to 17F.

In step S40, the "card file" menu shown in Fig. 8
is displayed. In step S41, whether the user activates
15 the card read button 63 is checked. If the card read
button 63 is activated, whether a card is set at the
card inlet 14 is checked in step S42. If the card is
set, the flow advances to step S43. In step S43, an
image of the card is read by the image scanner 8 and
20 displayed in the card image frame 50. In step S44, a
character recognition program based on pattern matching
is activated for the card image 50, and recognized
characters are displayed in the character recognition
result frame 51.

25 Note that the character recognition method based
on pattern matching is widely known through a large

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1 number of literatures and a detailed description
 thereof will be omitted.

 In step S45, the characters (a company name, a
division, a title, a personal name, an address, a phone
5 number, and a fax number) in the character recognition
result frame 41 are checked in units of lines, and only
determined characters are set in the columns 55 to 61
in the card data frame 52. After this processing or if
"NO"s are determined in steps S41 and S42, the flow
10 advances to step S46, and whether the user activates
the register button 64 is checked. If the register
button 64 is activated, a data group set in the card
data frame 52 is newly registered in the "card file" as
data of one card. If "NO" is determined in step S46,
15 the flow advances to step S48, and whether the user
activates the image register button 65 is checked. If
the image register button 65 is activated, the data
group set in the card data frame 52 and the card image
50 are newly registered in the "card file" as data of
20 one card image in step S49, and the flow advances to
step S50. If "NO" is determined in step S48, whether
the user activates one of the character lines in the
character recognition result frame 51 is checked in
step S50. If a line is activated, a tone of the
25 activated line is inverted. If the activated character
line is already inverted, however, the line is returned
to a standard tone. After this processing or if "NO"

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1 is determined in step S50, the flow advances to step
S52, and whether the user activates any of the items 53
in the data frame 52 is checked. If any of the items
53 is activated, whether an inverted character line is
5 present in the character recognition frame 51 is
checked in step S53. If an inverted character line is
present, the inverted line is copied in the activated
item 53 of the card data frame 52 in step S54. In step
S55, the inverted tone in the character recognition
10 frame 51 is returned to the standard tone, and the flow
advances to step S57.

If "NO" is determined in step S53, a tone of the
item 53 activated by the user is inverted, and the flow
advances to step S57. If "NO" is determined in step
15 S52, whether the user activates any of the data lines
54 in the card data frame 52 is checked in step S57.
If any of the data lines 54 is activated, a character
cursor is displayed at the head of the activated line
in step S58. In step S59, the user performs addition
20 and correction of the card data by using the keyboard
5, and the processing in step S59 is continued until a
return key is activated. If the return key is
activated, the flow advances from step S60 to S61, and
a character cursor is erased from the card data frame
25 52. If "NO" is determined in step S57, whether the
user activates the clear button 74 is checked in step
S62. If the clear button 74 is activated, all the data

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1 in the card image frame 50, the character recognition
result frame 51, and the card data frame 52 are cleared
in step S63. If "NO" is determined in step S62, the
flow advances to step S64, and whether the user
5 activates the search button 66 is checked. If the
search button 66 is not activated, the flow advances to
step S68. If the search button 66 is activated, data
in the "card file" coincident with characters set in a
part of the card data frame 52 is searched. In this
10 case, if the user activates the search button 66
without setting characters in the card data frame 52,
it is assumed that the user instructs
searching/displaying of all data. In step S66, the
number of searched cases is displayed in the message
15 75. In step S67, the first case of the searched data
is displayed in the card data frame 52.

If "NO" is determined in step S64, whether the
user activates the next page button 68 is checked in
step S68. If the next page button 68 is not pushed,
20 the flow advances to step S70. If the next page button
68 is activated, however, next data is displayed in
step S69 if a large number of searched data are present
and subsequent data is present after the currently
displayed data, and the flow advances to step S70. In
25 step S70, whether the user activates the preceding page
button 67 is checked. If the preceding page button 67
is activated, preceding data is displayed in step S71

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1 if a large number of searched data are present and data
already displayed is present preceding to the currently
displayed data. If "NO" is determined in step S70,
however, whether the user activates the print button 69
5 is checked in step S72. If the print button 69 is
activated, all of the searched data are printed out in
step S73. In step S74, whether the user activates the
correct button 70 is checked. If the correct button is
activated, the flow advances to step S75, and whether
10 the user corrects a part of the card data currently
being searched and displayed is checked. If the card
data is corrected, the corrected card data is
registered in the "card file" in step S76. In this
processing, the corrected data is overwritten on old
15 data. If "NO"s are determined in steps S74 and S75,
whether the user activates the delete button 71 is
checked in step S77. If the delete button 71 is
activated, one case of the currently searched and
displayed card data is deleted from the "card file" in
20 step S78.

If "NO" is determined in step S77, the flow
advances to step S79, and whether the user activates
the call button 73 is checked. If the call button 73
is activated, whether the handset 11a is off-hooked is
25 checked in step S80. If the handset is off-hooked, the
telephone set 11 is instructed to make a call by using
the phone number 60 in the card data frame 52 in step

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1 S81. If "NO"s are determined in steps S79 and
S80, whether the user activates the telephone book
button 72 is checked in step S82. If the telephone
book button 72 is not activated, the flow advances to
5 step S92. If the telephone book button ⁷² is activated,
whether the company name 55 or the personal name 58 is
set (both of the company and personal names 55 and 58
can be set) and the phone number 60 or the fax number
61 is set (both of the phone and fax numbers 60 and 61
10 can be set) in the card data frame 52 is checked in
step S83. If this check is determined ^{to be} no good in step
S84, the message 75 representing "data is insufficient"
is output in step S85. If the above check is
determined ^{to be} good, the flow advances to step S86, and
15 whether a tone of only one of the company and personal
names 55 and 58 of the items 53 is inverted and that of
only one of the phone and fax numbers 60 and 61 thereof
is inverted is checked. This result is checked in step
S87. If the result is determined ^{to be} no good, the flow
20 advances to step S88, and the message 75 representing
"which is to be registered ?" is output. If the result
is determined ^{to be} good, whether the company or personal
name 55 or 58 as an objected to be registered in the
"telephone book" is accompanied with indication of how
25 to read is checked in step S89. If the indication of
how to read is not accompanied, the message 75
representing "indicate how to read" is output in step

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1 S90. If the indication of how to read is already
accompanied, a data pair of the company or personal
name 55 or 58 and the phone or fax name 60 and 61 is
registered in the "telephone book" in step S91. For
5 example, a pair of "a company name and a telephone
number" is registered as one case in the "telephone
book". In step S92, whether the end button 26 is
activated is checked in step S92. If the end button 26
is activated, the "card file" program is ended. If the
10 end button 26 is not activated, the flow returns to
step S41, and the processing from step S41 is
repeatedly executed.

Fig. 18 is a view showing an analyzing direction
for each line of the image 50 obtained when the
15 character recognition program based on pattern matching
is executed in step S44 of the flow chart shown in
Fig. 17.

The processing in step S45 of the flow chart shown
in Fig. 17 will be described below with reference to a
20 flow chart shown in Fig. 19.

In step S100, the number of character lines in the
character recognition result frame 51 is counted to set
a variable n. In step S101, various variables are
initialized. In this case, "1" is set in m
25 representing the number of currently analyzed lines and
"0" is set in a flag a representing a set state of the
company name column 52 in the card data frame 52.

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1 Similarly, "0"s are set in a flag b for the division
column 56, a flag c for the title column 57, a flag d
for the personal name column 58, a flag e for the
address column 59, a flag f for the phone number column
5 60, and a flag g for the fax number column 61. In step
S102, whether the number of analyzed lines m exceeds
the number of lines n is checked. If the number m
exceeds the number n, the flow is ended. If the number
m does not exceed the number n, the flow advances to
10 step S103, and whether the company name column 55 is
set (a = 0) is checked. If the company name column 55
is already set, the flow advances to step S108. If the
company name column 55 is not set, whether characters
such as "company", "LTD.", "office", or "association"
15 are included on the line m is checked in step S104. If
the characters such as "company" are included, this is
determined in step S105, and the flow advances to step
S106. The line m in the character recognition result
frame 51 is set in the company name column 55 of the
20 card data frame 52, and the variable a = 1 is set to
record that setting in the company name column 55 is
completed.

The flow advances to step S107, and if the company
name set in the company name column 55 starts with
25 katakanas or hiraganas, the kana part is automatically
set in the frame for data indicating how to read in the
company name column 55. The flow advances to step

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1 S132, the currently analyzed line variable m is
incremented by one, and the flow returns to step S102
of the program, thereby forming a loop for repeating
the processing.

5 If "NO"s are determined in steps S103 and S105,
the flow advances to step S108, and whether the title
column 57 is set ($c = 0$) is checked. If the title
column 57 is not set, whether characters such as
"president", "managing director", "director",
10 "department manager", "section head", "vice-chief",
"chief clerk", "manager", "chief", or "section chief"
are included on the line m. If it is determined in
step S110 that the above characters are included, the
line m is set in the title column 57 of the card data
15 frame 52 and the variable $c = 1$ is set in step S111,
and the flow advances to step S132. If "NO"s are
determined in steps S108 and S110, whether the division
name can be set in the division column 56 ($b < 3$) is
checked in step S112. Note that three division names
20 can be set in this embodiment. This is because a
division name printed on a card is often described over
about three lines.

If "YES" is determined in step S112, whether
characters such as "department", "section", "room", or
25 "charge" are included on the line m is checked in step
S113. If the characters are included, the flow
advances from step S114 to S115. In step S115, the

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1 line m is set in the division column 56 of the card
data frame 52, the variable b is incremented by one,
and the flow advances to step S132.

5 If "NO"s are determined in steps S112 and S114,
whether the personal name 58 column is set ($d = 0$) is
checked in step S116. If the personal name column 58
is not set, an image line on the card image 50
corresponding to the line m is compared with the rest
in step S117. If the line m is widest, the flow
10 advances from step S118 to S119. In step S119, the
line m is set in the personal name column 58 of the
card data frame 52, $d = 1$ is set, and the flow advances
to step S132. Whether the line m is a personal name
line is checked on the basis of the width of an image
15 line because a line of "personal name" is widest on
many cards.

If "NO"s are determined in steps S116 and S118,
whether the address column 59 is set ($e = 0$) is checked
in step S120. If the address column 59 is not set,
20 whether a "〒" mark or a prefectural name is included on
the line m is checked in step S121. If the "〒" mark or
the prefectural name is included, the flow advances
from step S122 to S123. In step S123, the line m is
set in the address column 59 of the card data frame 52,
25 $e = 1$ is set, and the flow advances to step S132. If
"NO"s are determined in steps S120 and S122, the flow
advances to step S124, and whether the phone number

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1 column 60 is set ($f = 0$) is checked. If the phone
number column 60 is not set, whether a "telephone",
"TEL" or a "8" mark followed by numerals is included on
the line m is checked in step S125. If followed, the
5 flow advances from step S126 to S127. In step S127,
only the numerals on the line m are set in the phone
number column 60, and "1" is set in the variable f.
The flow then advances to step S132.

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10 If "NO"s are determined in steps S124 and S126,
the flow advances to step S128. If the fax number
column 61 in the card data frame 52 is not set ($g = 0$)
in step S128, whether characters of "facsimile" or
"FAX" followed by numerals are included on the line m
is checked in step S129. If followed, the flow
15 advances from step S130 to S131. In step S131, only
the numerals on the line m are set in the fax number
column 61 of the card data frame 52, and "1" is set in
the variable g. The flow advances to step S132, the
currently analyzed line variable m is incremented by
20 one, and the flow returns to step S102 of the program,
thereby forming a loop.

In this embodiment, a card is laterally placed and
character recognition for a laterally written card is
performed. However, it is a matter of course that a
25 card can be vertically placed and character recognition
and analysis for a vertically written card can be

1 performed. In addition, a card written in English can
be analyzed.

5 In this embodiment, both the telephone book and
the card file enable automatic calling of a "telephone
number". However, a "facsimile number" can be
similarly called in accordance with the telephone book
and the card file. For example, when the telephone
book is called in order to perform facsimile
transmission, only a customer registered by a
10 "facsimile number" can be displayed while a customer
registered by a telephone number is highlighted,
thereby alarming a user that the telephone number
cannot be used. Furthermore, an ^{edited} ~~edit~~ document
processed by a wordprocessor can be directly
15 transmitted by a facsimile by performing automatic
calling utilizing the telephone book or card file.

Fig. 20 is a flow chart for explaining a
transmission operation performed by a facsimile
function utilizing the above data base.

20 When a FAX transmission program is activated, a
file to be transmitted is designated (S151). A
document to be transmitted is stored in the file to be
transmitted, thereby forming a transmission data file.

A search key word for the above telephone book
25 file as a data base is input (S152). For example, this
search key word can be input by "□□□□" as shown in
Fig. 13.

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1 The telephone book file is searched by the search
key word to call and display corresponding customer
data on the CRT display 3 as shown in Fig. 14 (S153).

5 Upon selection by an operator, a customer to which
data is to be actually transmitted is designated from
the customer data displayed on the CRT display 3, and a
FAX transmission list file is formed (S154). In this
case, the operator can select a plurality of customers.

10 On the basis of the FAX transmission list file,
the contents of the transmission data file are
transmitted to the designated customer (S155).

15 Fig. 21 is a schematic view for explaining a
relationship between the contents of a telephone book
file 155, the search key word, and a FAX transmission
list file 156.

20 The telephone ^{book}~~book~~ file 155 stores, in addition to
a large number of customer data, customer data of a xx
corporation and its associated companies such as "xx
corporation", "xx corporation $\Delta\Delta$ branch office", and
"corporation xx service". By inputting "xx" as the
search key word, only customer data of the "xx
corporation and its associated companies are searched
from a large number of customer data and stored in the
FAX transmission list file 156. If necessary, the
25 contents of the FAX transmission data file 156 are
deleted or added to select only data to be transmitted.

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1 By selecting a suitable search key word as
described above, necessary customer data can be easily
searched.

Therefore, since multi-address communication can
5 be very easily performed by using customer data in the
telephone book file, a registration table for
multi-address communication need not be additionally
provided to solve a problem of a cumbersome operation.

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10 In recent years, a card is often printed such that
its upper surface is printed in Japanese while its
lower surface is printed in English. Therefore, two
image scanners for upper and lower surfaces can be
connected to perform image reading of both the surfaces
at the same time to execute character recognition of
15 both the surfaces, thereby forming both the surfaces
into card data bases. At this time, if pronunciations
of English words are converted into kanas, data
indicating how to read a company name and a personal
name written in Japanese on the upper surface can be
20 automatically set, thereby reducing a load on a user.
In addition, especially when a map is printed on the
lower surface instead of an English card, card file
image registration effectively functions.

In the above embodiment, only a card has been
25 described as an object to be processed. However, a
document of a fixed form having definite contents such
as a postcard for invitation can be subjected to image

1 reading, character recognition, and data base
formation.

In the above embodiment, card image registration
can be performed in the "card file". However,
5 processing can be performed such that a card image is
corrected by an image editor program before
registration, a simple map or the like is added, and
then image registration is executed. In this case, the
image editor program is stored in the auxiliary
10 storage.

In the above embodiment, the present invention has
been described with reference to the information
processing apparatus having a plurality of functions
such as a personal computer function, a telephone
15 function, a facsimile function, and a wordprocessor
function. As a simplest application form of the
present invention, however, telephone sets as shown in
Figs. 22 and 28 can be made.

Referring to Fig. 22, a telephone set 77 includes
20 a handset 78, push buttons 79, and a liquid crystal
display 80 for displaying a phone number and a time.
These parts are arranged similarly to those of a
conventional telephone set.

Display buttons 81 and 82 are located at the side
25 of the liquid crystal display 80. The display buttons
81 and 82 are for selecting a phone number displayed on
the liquid crystal display 80. That is, this

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1 embodiment optically reads a phone number of a card,
recognizes it, and uses it for calling. However, a
plurality of phone numbers of, e.g., a home, a main
office, and a branch office are often described on a
5 card. Therefore, two of the phone numbers are read,
recognized, and displayed on the display 80, and one of
the two numbers is selected by the display buttons 81
and 82.

10 The telephone set 77 also has a card inlet (to be
referred to as a slot hereinafter) 83. The slot 83 is
for inserting a card whose phone number is to be read
and has a mechanism for transporting and optically
reading a card.

15 The telephone set 77 has, at its rear portion, a
telephone line 84 for communication and a power source
cable 85 for supplying power to the telephone set.

Fig. 23 shows a control system incorporated in the
telephone set shown in Fig. 22.

20 Referring to Fig. 23, a telephone set circuit 86
includes a voice signal amplifying section for the
handset 78, an input circuit for the push buttons 79, a
line controller, a power source circuit, and the like.
An arrangement of the telephone set circuit 86 is
similar to that of a conventional circuit. Note that
25 the telephone set circuit 86 incorporates, in addition
to the above circuits, a known dialing circuit for

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1 sending a dial signal corresponding to input phone
number data onto a line.

 A central processing unit (to be referred as a CPU
hereinafter) 87 for controlling the entire apparatus is
5 connected to a control memory 88.

 The memory 88 is divided into two parts, a ROM 88a
and a RAM 88d. The ROM 88a stores a control program
88b and a display character font 88c. The RAM 88d
includes a storage area 88e for developing and storing
10 a dot image of a card, storage areas 88f and 88g for
recording a phone number, and a storage area 88h for
storing data for programs.

 The CPU 87 is also connected to the following
members to be controlled besides the memory 88.

15 That is, members 89 to 92 are for reading a phone
number of a card. An image sensor 89 is constituted by
a CCD line sensor or the like. A card transporter 90
accommodates a card into the apparatus or delivers it
therefrom. A sensor 91 detects whether a card is
20 inserted in the slot. A sensor 92 detects whether
accommodation of a card into the apparatus is completed.
These circuits and mechanisms are arranged around the
slot 83 as will be described later.

 The liquid crystal display 80 for displaying a
25 phone number has a two-line width and is connected via
a known display controller or the like (not shown).

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1 The display buttons 81 and 82 are for selecting a
first or second one of two phone numbers displayed on
two display lines of the display 80, thereby performing
automatic calling.

5 Fig. 24 shows an arrangement of the image sensor
89, the card transporter 90, and the like inside the
slot 83 of the telephone set 77.

 When a card 93 is inserted from the slot 83 by an
operator, the sensor 91 detects the leading edge of the
10 card 93, and driving of eight transport rollers 90a
(driven by a motor or the like (not shown) of the card
transporter 90) constituting the card transporter 90 is
started. The card 93 is accommodated to the left of
Fig. 24 at a constant speed, while an image of the card
15 93 is read by the image sensor 89 located at a central
portion of the rollers 90a and stored in the memory 88.

 When the card 93 is accommodated to a certain
degree, the sensor 92 detects the leading edge of the
card 93, and reverse rotation of the transport rollers
20 90a is started. Finally, the card 93 is delivered from
the slot 83, and a read operation is completed. Note
that the sensors 91 and 92 are constituted by
reflecting photosensors or the like.

 An operation of the above arrangement will be
25 described below with reference to flowcharts in
Figs. 25A to 25C. Procedures shown in Figs. 25A
to 25C are stored in the ROM 88a of the memory 88 as

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1 programs of the CPU 87 and started when the telephone
set 77 is connected to the power source cable 85 and
power supply to the apparatus is started.

When power supply to the apparatus is started, the
5 CPU 87 checks in step S160 of Fig. 25A whether the
handset 78 is off-hooked. If the hand-set is not
off-hooked, the flow loops and waits.

If the hand-set 78 is off-hooked, the flow
advances to step S161, and whether a card is inserted
10 in the slot 83 is checked by detecting a change in
output signal from the sensor 91. If the card 93 is
not inserted, the flow returns to step S160 and loops.
If the card is inserted, the flow advances to step
S162, and the transporter 90 is instructed to
15 accomodate the card.

Note that an operator inserts the card in the slot
83 so that a surface on which a phone number is
described or printed faces the image sensor 89. At
this time, as indicated by arrows shown in Figs. 26A
20 and 26B, the card is inserted in the slot 83 such
that the head of a line of the card is set toward a
predetermined direction (in this case, coincident with
an insertion direction) regardless of whether the card
is laterally written (Fig. 26A) or vertically written
25 (Fig. 26B).

When the card 93 is inserted in the slot 83, the
transport rollers 90a start rotating at a constant

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1 speed in step S163, thereby accomodating the card 93.
The image sensor 89 reads a printed image on the card
with predetermined resolution, and read binary data is
developed and stored in the card image storage area 88e
5 on the RAM 88d of the memory 88. This operation is
continuously executed until the sensor 92 detects the
leading edge of the card 93 in step S164.

When image reading of the card is completed, the
flow advances to step 165, and the card transporter 90
10 is instructed to deliver the card. The transport
rollers 90a start rotating in the reverse direction to
deliver the card 93 from the slot 83.

In step S166 of Fig. 25B, the storage area 88f
for a phone No. A and the storage area 88g for a phone
15 No. B of the RAM 88d are cleared. In step 167, "1" is
set in a counter variable "n". The counter variable
"n" is for reading up to two phone numbers from the
same card and takes two values "1" and "2" representing
the number of reading times of a phone number.

20 In step S168, data in the storage area 88e for
image data is searched in units of lines. In this
case, as shown in Figs. 27A and 27B, a direction
along which characters continue corresponding to the
longitudinal direction of the card 93 is considered as
25 a direction of "line" regardless of whether the card is
laterally or vertically written. In a direction
indicated by reference symbol Sr, a line including

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1 characters such as "telephone", "TEL", vertically
written "telephone" or a mark representing a telephone
set is searched by a known pattern matching method of
character recognition (OCR). Note that if $n = 2$ in
5 step S168, i.e., if searching is to be performed for
the second time, lines outside those searched for the
first time are searched.

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If a line including characters such as "telephone"
or a mark is found in step S168, the flow advances from
10 step S169 to S170. If a corresponding line is not
found, the flow advances to step S172. In step S172,
an alphanumeric image following "telephone" or a
kanji/numeral image following vertically written
"telephone" is analyzed by the pattern matching method
15 of OCR, thereby obtaining a code train (e.g., an ASCII
code) representing a phone number. The pattern
matching method of OCR is well known and a detailed
described thereof will be omitted. The OCR processing
may be performed by the CPU 87 or another recognition
20 control system.

In step S171, whether the counter variable "n"
satisfies $n = 1$, i.e., whether searching is performed
for the first time is checked. If searching is
performed for the first time, the code train obtained
25 in step S170 is stored in the storage area 88f of the
RAM 88d, and $n = 2$ is set as the counter variable "n"

1 in step S174. The flow then returns to step S168 to
start an operation for obtaining a second phone number.

 If the counter variable "n" does not satisfy $n = 1$
in step S171, the flow advances to step S175, and the
5 code train obtained in step S170 is stored in the
storage area 88g of the RAM 88d.

 In step S176, the phone number data in the storage
areas 88f and 88g are displayed on the display 80 by
using the data stored in the character font storage
10 area 88c of the ROM 88a.

 If characters such as "telephone" are not found in
step S169, the flow advances to step S172. If $n = 1$,
i.e., if characters are not found by first searching,
the flow returns to the start of the program and waits
15 until another card is inserted in the slot 83. If $n =$
2, i.e., if characters are not found by second
searching, the phone number is displayed on the display
80 in step S176. At this time, the storage area 88g is
cleared.

20 The flow then advances to step S177 in Fig. 25(c).
If an operator activates the display button 81, the
telephone set circuit 86 is instructed to perform
calling in accordance with the phone number stored in
the storage area 88f, and the flow returns to the start
25 of the program, thereby ending the processing. The
dialing circuit of the telephone set circuit 86
transmits a dial signal corresponding to the input

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1 phone number represented by a character code such as an
ASCII code or binary data to the telephone line.

5 If it is determined that the display button 81 is
not activated, the flow advances to step S179. If the
display button 82 is activated, the telephone set
circuit 86 is instructed to perform calling by using
the phone number data stored in the storage area 88g in
step S180, and the flow returns to the start of the
program, thereby ending the processing.

10 If a trunk code of the telephone set 77 stored in
a part of the memory 88 coincides with a trunk code of
a customer, phone number data without the trunk code is
supplied to the dialing circuit of the telephone set
circuit 86, and dial processing is performed on the
15 basis of this data.

20 If it is determined in step S179 that the display
button B 82 is not activated, the flow advances to step
S181, and whether the new card 93 is inserted in the
slot 83 is checked. If the card 93 is inserted, the
flow returns to the start of the program to execute the
reading processing for the card 93 again.

25 If the card 93 is not inserted, the flow advances
to step S182, and whether the handset 78 is returned to
an ON hook state is checked. If the handset 78 is not
returned to the ON hook state, the flow returns to step
S177 to repeat determinations in steps S177, S179,
S181, and S182. If it is determined that the handset

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1 78 is returned, the flow returns to the start of the
program and waits.

 According to the above telephone set, character
data following characters such as "telephone" is
5 optically read, recognized, and used to perform
calling. Therefore, unlike in a conventional
apparatus, even if phone number data is not described
nor printed on a predetermined position by a special
recording system such as a bar code, phone number data
10 can be read from any type of a card, and calling can be
automatically performed on the basis of the read data,
thereby simplifying a calling operation and preventing
an operational error. In particular, since a phone
number can be read and recognized regardless of whether
15 it is laterally or vertically written, the present
invention has high versatility.

 In addition, a plurality of phone numbers of a
card can be read and recognized, and a desired one of
the phone numbers can be selected by a simple button
20 operation. Therefore, phone number information
described on a card can be utilized substantially
similarly to a case of manual calling.

 Still another embodiment in which the present
invention is applied to a telephone set will be
25 described below. This embodiment is a telephone set
for reading and recognizing a phone number on a
document or printed matter not a card but various types

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1 of leaflets or pamphlets and using it to perform
calling.

A difference between telephone sets shown in
Figs. 22 and 28 is that a display area of a display 80
5 has a size of three lines and therefore can display
three phone numbers and three display buttons 94 to 96
are provided to select one of three phone numbers
accordingly.

The apparatus shown in Fig. 28 has an image sensor
10 97 on the upper surface of the apparatus as a reading
mechanism. The image sensor 97 is constituted by a
two-dimensional CCD sensor or the like and arranged to
read image data on a portion corresponding to a hatched
area shown in Fig. 28 of a document or printed matter
15 placed to face downward on the image sensor 97. A read
timing of the image sensor 97 is determined by
activation of a read start button 98.

Push buttons 79 and the display buttons 94 to 96
are embedded in the apparatus such that their upper end
20 faces are set lower than the surface of the apparatus.
Therefore, when a user sets a document or printed
matter on the image sensor 97, erroneous activation of
buttons by the user can be prevented.

Fig. 29 shows an arrangement of a control system
25 of the apparatus shown in Fig. 28. The circuit shown
in Fig. 29 has substantially the same arrangement as
that of the circuit shown in Fig. 23 except that the

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1 image sensor 97 is of a fixed type; three display
buttons 94 to 96 are used, and three data areas 881 to
883 for a phone number are formed in a RAM 88d
accordingly; and the image sensor 97 of an original
5 fixed type does not transport an original unlike in the
above embodiment but reads image data in the
two-dimensional read area and is constituted by an
optical system, a two-dimensional image sensor, and the
like.

10 Operations of the above arrangement will be
described below with reference to flowcharts shown in
Figs. 30A and 30B. Note that this program is
started when a power source is connected to the
telephone set 77.

15 In step S190 of Fig. 30A, whether the read start
button 98 is activated is checked. If the read start
button 98 is activated, a read/analysis routine of an
original such as a document or printed matter is
started from step S191. Note that an operator places
20 the original on the image sensor 97 such that a line
direction of characters coincides with the longitudinal
direction (lateral direction in Fig. 28) of the image
sensor 97 and activates the read start button 98 at a
desired timing.

25 In step S191, the image sensor 97 is started. In
step S192, an image of the original placed on the image
sensor 97 is read by the image sensor 97 and developed

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1 and stored as binary data in a printed image area 88e
of the RAM 88d of the memory 88.

In step S193, the storage area 88e is searched and
analyzed in units of lines by a pattern matching method
5 of character recognition (OCR) as in the above
embodiment, thereby obtaining a maximum of three phone
numbers. The processing in step S193 will be described
in detail later.

In step S194, the obtained phone number data are
10 stored in the phone number storage areas 881 to 883 of
the RAM 88d. If the number of the obtained phone
numbers is less than three in step S193, phone Nos. A,
B, and C are cleared accordingly.

In step S195, the areas 881 to 883 of the RAM 88d
15 are displayed on the display 80, and the flow returns
to the start of the program and waits until the user
activates the display buttons 94 to 96. This state is
similar to that in the above embodiment except that
three phone numbers are displayed on the display 80.

If it is determined in step S190 that the read
20 start button 98 is not activated, the flow advances to
step S196. If the handset 78 is not off-hooked in step
S196, the flow loops and waits for another instruction
from the user.

If it is determined in step S196 that the handset
25 78 is off-hooked, the flow advances to step S197 in
Fig. 30B.

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1 Step S197, S200, or S203 is for checking
activation of a corresponding one of the display
buttons 94 to 96. If any of the display buttons 94 to
96 is activated, the flow advances to a corresponding
5 one of steps S198, S201, and S204.

 In each of steps S198, S201, and S204, whether a
phone number is stored in one of the storage areas 881
to 883 corresponding to the display buttons 94 to 96,
respectively. If a phone number is not stored, the
10 flow returns to step S190 in Fig. 30A.

 If a phone number is stored in any of steps S198,
S201, and S204, the flow advances to a corresponding
one of steps S199, S202, and S205, and phone number
data stored in a corresponding one of the areas 881 to
15 883 is supplied to the telephone set circuit 86,
thereby performing calling as described above. As in
the above embodiment, if a trunk code of the telephone
set coincides with that of a customer, a phone number
without the trunk code is used.

20 In this manner, calling can be performed for a
customer by using phone number data read from any type
of a document or printed matter by the image sensor 97
and subjected to character recognition. Figs. 31A
and 31B show in detail the read processing in step
25 S193 of Fig. 30A.

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1 In step S206, arrays TELA, TELB, and TELC set in a
work area of a memory for temporarily registering a
phone number are cleared, and "0" is set in a counter.

5 In step S207, binary image data in the storage
area 88e is searched in units of lines by a pattern
matching method of OCR to find a line including
characters such as "telephone", "TEL", vertically
written "telephone" or a mark representing a telephone
set. As in the case shown in Fig. 27, a search
10 direction coincides with an arranging direction of
characters of the original. In addition, the counter
variable "n" is reset as described above. In this
case, however, the counter variable "n" is controlled
to extract three phone numbers.

15 If $n = 1$ is determined in step S207, i.e., if
searching is to be performed for the second time, lines
outside those searched when $n = 0$, i.e., upon first
searching are searched. If $n = 2$, i.e., upon third
searching, lines outside those searched when $n = 0$ and
20 $n = 1$, i.e., upon first and second searchings are
searched. If a line including characters such as
"telephone" are found in step S207, the flow advances
from step S208 to step S209. If a corresponding line
is not found, this subroutine returns to the main
25 routine and ends.

 In step S209, as in the above embodiment, an
alphanumeric image following "telephone" or the like or

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1 a kanji/numeral image following vertically written
"telephone" is analyzed by the pattern matching method
of OCR, thereby obtaining a code train corresponding to
the phone number.

5 In step S210, whether $n = 0$ is satisfied, i.e.,
whether searching is to be performed for the first time
is checked. If searching is to be performed for the
first time, the code train obtained in step S209 is set
in the array TELA in step S211. Similarly, the code
10 train is set in the array TELB in steps S212 and S213
if $n = 1$, and the code train is set in the array TELC
in steps S214 and S215 if $n = 2$.

After the code train is set, the flow advances to
step S216 in Fig. 31B, and the counter \underline{n} is counter
15 up. If it is determined in step S217 that the counter
 \underline{n} is two or less, the flow returns to step S121, and
searching of a phone number is executed again. If the
counter \underline{n} is larger than two (i.e., three phone numbers
are already read), the processing is ended, and the
20 flow returns to the routine shown in Fig. 30A.
Thereafter, data of the arrays TELA, TELB, and TELC are
transferred to the storage areas 881 to 883,
respectively.

In this manner, up to three phone number data can
25 be read and recognized.

In the above embodiment, an arranging direction of
lines of an original must be aligned with the

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1 longitudinal direction of the image sensor 97. In
order to easily perform this positioning, a matrix
pattern 97a as shown in Fig. 32 may be printed or
marked on the upper surface of the telephone set 77.
5 By aligning a corner or side of an original with the
matrix pattern 97a, an operator can set a printed
matter on the upper surface of the image sensor 97
without a skew.

10 The present invention can be applied not only to a
telephone set but also to a facsimile apparatus.

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